ELEMENTS OF THE CHICXULUB IMPACT STRUCTURE AS REVEALED IN SRTM AND SURFACE GPS TOPOGRAPHIC DATA.

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Pope *et al*. [1] utilized the elevations from the Petroleos Mexicanos (PEMEX) gravity data files to show that the main component of the surface expression of the Chicxulub Impact Structure is a roughly semi-circular, low-relief depression about 90 km in diameter. They also identified other topographic features and the elements of the buried impact, which possibly led to the development of these features. These are summarized in Table 1. Kinsland *et al.* [2] presented a connection between these topographic anomalies, small gravity anomalies and buried structure of the impact.

Very recently we have acquired digital topography data from NASA's Shuttle Radar Topography Mission (SRTM). Our subset covers 6 square degrees from 20deg N 91degW to 22deg N 88degW (corner to corner) with a pixel size of about 90m. This area includes all of the identified portion of the crater on land.

Images from these data (example in Figure 1) very clearly show the circular depression of the crater and the moat/cenote ring. In addition to these major features, we can readily identify Inner trough 1, Inner trough 2 and Outer trough as defined by Pope *et al.* [1]. The agreement, both in general and in detail, between the topographic maps of Pope *et al.* [1] and Kinsland *et al.* [2] and SRTM data are remarkable considering that the distribution and types of data in the sets are so different.

We also have ground topographic data collected with a special "autonomous differential GPS" system during summer 2002. Profiles from these data generally agree with both the gravity data based topographic maps and profiles extracted from the SRTM data.

Preliminary analyses of our new data, SRTM and GPS, have uncovered features not previously recognized: 1) as shown by the GPS on the highway from Merida to Valladolid the moat/cenote ring consists of two distinct depressions separated by about 10 km…perhaps separate ring faults, 2) in the SRTM data over the southern part of the crater and on southward for perhaps 20 km beyond the moat/ cenote ring there exists a pattern, as yet unexplained, of roughly concentric topographic features whose center lies at about 21deg 40min N and 89deg 25min W, about 50km NNE of the moat/cenote ring center.

The corroboration and better definition of the previously recognized topographic features yielded by the two new forms of data strengthens the cases for these features and for their relevance to the underlying collapsed crater structure. Topographic features over Chicxulub could serve as proxies for delineation of the buried structural elements and as such could provide valuable constraints for impact models which utilize the shapes and sizes of the collapsed transient crater, peak ring and various ring faults.

TABLE 1 (DATA FROM POPE *ET AL.* [1])

Feature	Radius (km)	Corresponding buried crater structure
Inner trough 1	41+/- 2	Inner edge of peak ring
Inner trough 2	62+/- 5	Outer edge of peak ring, ring fault
Moat	83+/- 3	Ring fault
Outer trough	103+/- 6	Ring fault

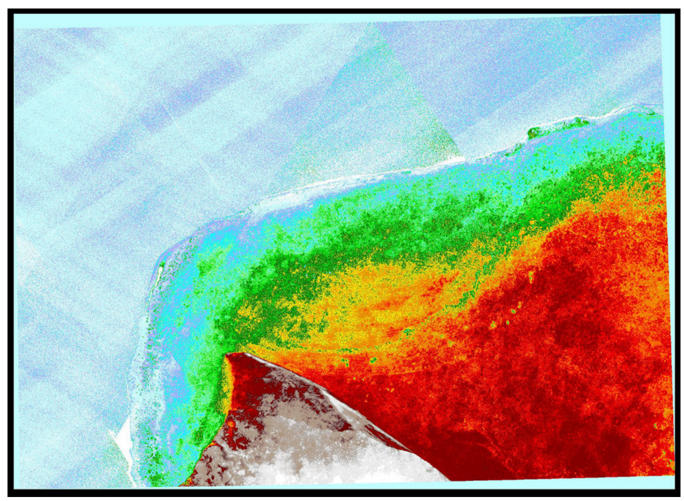

FIGURE 1 SRTM topographic image over the Chicxulub Impact Crater region, Yucatan Peninsula, Mexico

References: [1] Pope, Kevin O., Ocampo, Adriana C., Kinsland, Gary L. and Smith, Randy (1996) *Geology,24*, 527 – 530. [2] Kinsland, Gary L., Hurtado, Manuel and Pope, Kevin O. (2000) *Geophysical Research Letters, 27*, 1223 – 1226.